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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/533,090	04/29/2005	Norikazu Tabata	IPE-055	2293

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EXAMINER	
DICKINSON, PAUL W	
ART UNIT	PAPER NUMBER
1618	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/533,090	TABATA ET AL.	
	Examiner	Art Unit	
	PAUL DICKINSON	4173	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 November 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-44* is/are pending in the application.

4a) Of the above claim(s) *11-33, 36, 38-39, 41-44* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10,34,35,37 and 40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/17/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Group I, Claims 1-10, 34-35, 37 and 40, in the reply filed on 11/26/2007 is acknowledged.

Claims 1-44 are pending. Claims 11-33, 36, 38-39, 41-44 are directed to a nonelected species and are hereby withdrawn. Claims 1-10, 34-35, 37 and 40 are currently under consideration.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 5, 34 and 40 are rejected under 35 U.S.C. 112, second paragraph, as failing to set forth the subject matter which applicant(s) regard as their invention.

The phrase "particle size distribution width in a range of average particle size +/- 100 micrometer" in Claim 5 is vague and indefinite. A numerical value is missing before the "+/-". Without some value here, the phrase is nonsensical.

Claim 34 recites the limitation "the film formed from the synthetic polymer". It is unclear what "the film" corresponds to. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-10, 35, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 2001072280 in view of US 7160551.

'280 discloses microspheres (microparticles) which comprise a synthetic polymeric material capable of embolizing a blood vessel (see p 11, ln 12-15). The disclosed microspheres are based on biocompatible, hydrophilic, substantially spherical, and non-toxic synthetic polymers (see p 12, ln 20-27; p 19, ln 11-13). In one embodiment, the microspheres are biodegradable microspheres (see p 20, ln 4-5). The disclosed microspheres have diameters ranging between about 10 microns to about 2000 microns (see p 20, ln 7-10). '280 discloses the importance of optimum swellability in the invention application, which can be manipulated by controlling the degree of crosslinking which, as known to a skilled artisan, can be achieved either chemically or through radiation (see p 20, ln 18-30; p 21, ln 13-27). The disclosed microspheres have a swelling ratio of at least 100%, and the disclosed microspheres are capable of swelling to about 15 times their original size (see p 21, ln 13-18). '280 discloses that plastic beads are known embolization materials (see p 4, ln 5-15), and a copolymer of poly(lactic acid) with polyethylene glycol is a preferred polymeric material (see p 19, ln 1-6). '280 contemplates replacing the disclosed microsphere materials with any biocompatible, non-toxic, non-resorbable polymeric particles, membrane, fibers or other solid substrates is contemplated (see p 21, ln 27-30). '280 fails to disclose an embolization material that is degradable in a phosphate buffered saline of 37^{o} C. '280 further fails to disclose an embolization material wherein the remaining mass after it is immersed in a phosphate buffered saline of 37 ^{o}C for 28 days is 80% or less of the weight of it not yet immersed.

'551 discloses that a polymer is determined to be biodegradable or non-biodegradable by the following test: A solution of the polymer in N-methyl pyrrolidone is added to phosphate buffered saline of pH 7.4 and maintained at a temperature of 37 ^{o}C. The weight average molecular weight is measured periodically over time. A polymer is biodegradable if its weight average molecular weight is reduced by at least 25% relative to the starting weight average molecular weight over a period of 6 months (see col 3, ln 20-30). The test encompasses determining the biodegradability of poly(ethylene glycol) copolymers (see col 3, ln 60-62).

One of ordinary skill in the art would be motivated to combine the disclosures of '280 and '551 to afford the instant invention. Specifically, in an effort to find improved embolization materials, one would reasonably produce a material that has a water swelling ratio of 100% or more (which is encompassed by 30% or more in Instant Claim 1) and is formed as particles containing a synthetic biodegradable polymer. The utility of such biodegradable synthetic polymers as embolization materials is disclosed by '280, and '551 discloses the test for polymer biodegradability, specifically, measuring the weight average molecular weight in a phosphate buffered saline at 37^{o} C. One would therefore be motivated to test for biodegradability in this way, measuring the degradation in phosphate buffered saline at 37 ^{o}C over time. The Examiner is interpreting "physiologic saline" in Instant Claims 35 and 37 to encompass phosphate buffered saline. As taught by '280, the swellability of the synthetic biodegradable polymers can be optimized by adjusting the degree of crosslinking via known

chemical or radiation techniques. One would be motivated to choose a copolymer of poly(lactic acid) and polyethylene glycol as the synthetic polymer, as this compound is disclosed by '280 for this purpose. This notwithstanding, copolymers of poly(ethylene glycol) are reasonable candidates for polymers that are biocompatible, non-toxic, and non-resorbable, as contemplated by '280. One would be motivated to form particles with an average particle sizes of 50 microns or more, as this range is disclosed by '280.

Instant Claims 6 and 10 are directed to an embolization material wherein the remaining mass after it is immersed in a phosphate buffered saline of 37 ^{o}C for 28 days is 80% or less of the weight of it not yet immersed. Optimization of this parameter is not, in itself, patentable subject matter. Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Claims 34 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 2001072280 in view of US 7160551 in further view of US 6586354. As stated above, '280 discloses microspheres (microparticles) which comprise a synthetic polymeric material capable of embolizing a blood vessel. The disclosed microspheres are based on biocompatible, hydrophilic,

substantially spherical, and non-toxic synthetic polymers. In one embodiment, the microspheres are biodegradable microspheres. '280 discloses the importance of optimum swellability in the invention application, which can be manipulated by controlling the degree of crosslinking which, as known to a skilled artisan, can be achieved either chemically or through radiation. The disclosed microspheres have a swelling ratio of at least 100%, and the disclosed microspheres are capable of swelling to about 15 times their original size. '280 discloses that plastic beads are known embolization materials, and a copolymer of poly(lactic acid) with polyethylene glycol is a preferred polymeric material. '280 contemplates replacing the disclosed microsphere materials with any biocompatible, non-toxic, non-resorbable polymeric particles, membrane, fibers or other solid substrates is contemplated. '280 fails to disclose an embolization material that is degradable in a phosphate buffered saline of 37° C. '280 further fails to disclose an embolization material that is degradable in a phosphate buffered saline of 37 °C. '280 further fails to disclose a film formed from the synthetic polymer.

As stated above, '551 discloses that a polymer is determined to be biodegradable or non-biodegradable by the following test: A solution of the polymer in N-methyl pyrrolidone is added to phosphate buffered saline of pH 7.4 and maintained at a temperature of 37 °C. The weight average molecular weight is measured periodically over time. A polymer is biodegradable if its weight average molecular weight is reduced by at least 25% relative to the starting weight average molecular weight over a period of 6 months.

‘354 discloses that copolymers of polyethylene oxide can be components in films (see Claims 1-2).

One of ordinary skill in the art would be motivated to combine the disclosures of ‘280, ‘551 and ‘354 to afford the instant invention. Specifically, in an effort to find improved embolization materials, one would reasonably produce a material that has a water swelling ratio of 100% or more (which is encompassed by 30% or more in Instant Claim 1) and is formed as particles containing a synthetic biodegradable polymer. The utility of such biodegradable synthetic polymers as embolization materials is disclosed by ‘280, and ‘551 discloses the test for polymer biodegradability, specifically, measuring the weight average molecular weight in a phosphate buffered saline at 37^{o} C. One would therefore be motivated to test for biodegradability in this way, measuring the degradation in phosphate buffered saline at 37 ^{o}C over time. The Examiner is interpreting “physiologic saline” in Instant Claim 40 to encompass phosphate buffered saline. As taught by ‘280, the swellability of the synthetic biodegradable polymers can be optimized by adjusting the degree of crosslinking via known chemical or radiation techniques. One would be motivated to choose a copolymer of poly(lactic acid) and polyethylene glycol as the synthetic polymer, as this compound is disclosed by '280 for this purpose. This notwithstanding, copolymers of poly(ethylene glycol) are reasonable candidates for polymers that are biocompatible, non-toxic, and non-resorbable, as contemplated by '280.

If desired, one could incorporate the polyethylene oxide copolymer into a film. Optimization of the elastic modulus of the film does not, in itself, constitute

patentable subject matter. Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

As stated above, the limitation "the film formed from the synthetic polymer" in Instant Claim 34 is vague and indefinite. The Examiner finds one reasonable interpretation of this phrase to encompass incorporation of the polyethylene oxide copolymer into a film.

Conclusion

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL DICKINSON whose telephone number is (571)270-3499. The examiner can normally be reached on Mon-Thurs 8:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Ardin H. Marschel can be reached on 571-272-0718. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Paul Dickinson
Examiner
US 4173

January 15, 2008

/Ardin Marschel/
Supervisory Patent Examiner, Art Unit 1614